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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/006,100	12/03/2001	Robert A. Shepherd JR.	NOVEP015	9461

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EXAMINER

ZERVIGON, RUDY

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 03/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

83

Office Action Summary	Applicati n N .		Applicant(s)	
	10/006,100		SHEPHERD ET AL.	
	Examiner		Art Unit	
	Rudy Zervigon		1763	

-- The MAILING DATE of this communicati n appears on the cover sheet with the correspondenc address --

Period f r Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 December 2001 .
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>4</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 10 recites the limitation "the increased impedance" in the third line. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moslehi et al (USPat. ~~4,761,269~~) in view of Alan Notman (USPat. 4,311,671). Moslehi teaches an apparatus (Figures 1,3,4) for managing plasma (column 5, lines 15-37) in wafer processing operations (column 2, lines 60-68) comprising:
 - i. A housing (Figure 3) having an fluid entry port (122) and a fluid exit port (152), the housing having an internal region (124, 162, 154) defined by a top horizontal wall (126/122 interface), a bottom horizontal wall (144) and a circular side wall (142)
 - ii. Three circular ("annular pumping space"; column 9, lines 55-63), horizontally placed, baffle plates (134, 132, 130; Figure 3), each of the baffle plates define a level in a multilevel structure formed in the internal region within the housing (Figure 3), each baffle plate being

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separated from one another and separated from both the top horizontal wall and the bottom horizontal wall by a separation spacing (Figure 3), each of the plurality of baffle plates including:

- a. A plurality of holes (168), the plurality of holes in each of the baffle plates being oriented so that holes defined in each of the plurality of baffle plates are aligned thus defining a linear path for fluids designed to enter the entry port (Figure 3), traverse each level of the multilevel structure defined by the plurality of baffle plates, and leave the exit port of the housing
 - b. A gas inlet port / fluid input (156, Figure 3) in at least one of the separating spacing (154), the gas inlet port configured to inject gas (160) into the housing in at least one of the separating spacing (154)
- iii. A housing (126, Figure 3) configured to have a first chamber (154) and a second chamber (162), the first and second chamber being separated by a wall (132) having a plurality of orifices (conduits, not labeled) the housing having an input / input port (122) at a first end for supplying a plasma (column 10, lines 17-41) into the first chamber and an output port (152) at a second end of the housing, the input port and the output port being aligned with each other and aligned with each of the plurality of orifices
- iv. The plasma supplied through the input port capable of mixing with the supplied fluid within the second chamber (154; column 10, lines 17-41) – this is inherent due to the variable flow rates permitted by Moslehi (“gas flow controller (not shown)”); column 6, lines 5-9)
- v. The gas inlet port (156, Figure 3) is in an uppermost separation spacing (154)
- vi. A gas port (164, Figure 3) is in a lowermost separation spacing (162)

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vii. The gas injected from the gas inlet port mixes with the plasma in the separation spacing (column 10, lines 17-41)

viii. A fluid conduit (164) is provided in the second chamber

Moslehi then does not teach the plurality of holes are misaligned defining a nonlinear path for fluids. Moslehi does not teach that the posterior gas mixing undergoes turbulent mixing.

Alan Notman teaches a synthesis reactor (Figure 5) including baffles plates (16b', 16b'', 49') each with plurality of holes (52, 36 for 16b'; 53, 36 for 16b''; 54, 36 for 49') are misaligned defining a nonlinear path for fluid flow.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to shift (move) one or more of Moslehi's baffle plates horizontally such that each of the plurality of holes are misaligned defining a nonlinear path for fluid flow as taught by Alan Notman and to alter the flow rates of the injected gases to increase turbulent mixing.

Motivation to shift (move) one or more of Moslehi's baffle plates horizontally such that each of the plurality of holes are misaligned defining a nonlinear path for fluid flow as taught by Alan Notman is to provide for a nonlinear flow through the reactor.

Motivation to alter the flow rates of Moslehi's injected gases to increase turbulent mixing is to optimize the mixing of the plasma and nonplasma gases. Further, it would be obvious to those of ordinary skill in the art to optimize the operation of the claimed invention (In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980); In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); Merck & Co. Inc. v. Biocraft Laboratories Inc., 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989); In re Kulling, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990), MPEP 2144.05).

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3. Claims 18-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moslehi et al (USPat. 4761269) and Alan Notman (USPat. 4,311,671) in view of James W. Rudolph (USPat. 5,480,678). Moslehi and Alan Notman are discussed above. Moslehi further teaches a wafer processing chamber (152, Figure 3). Moslehi does not teach perforated hollow tubes. However Alan Notman does teach hollow tube conduits that are not perforated.

James W. Rudolph teaches a similar gas dispersion plates (104, Figure 6) that are also staggered.

James W. Rudolph further teaches a hollow tube conduit (17, Figure 6) that is perforated.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to perforate Alan Notman's holes (52, 36 for 16b'; 53, 36 for 16b''; 54, 36 for 49') in Moslehi's plasma processing chamber.

Motivation to perforate Alan Notman's holes in Moslehi's plasma processing chamber is to disperse the process gasses along the path of flow as taught by James W. Rudolph.


Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. USPat. 6,432,831; 4,761,269; 6,098,965; 6,521,858; 4,951,603; 6,245,396; 4,979,465; 5,354,412; 5,399,199; 4,508,054; 5,252,131; 6,161,500; 6,123,775; 6,123,775; 2,245,145; 6,245,192.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (703) 305-1351. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after final fax phone number for the 1763 art unit is (703) 872-9311.

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The official before final fax phone number for the 1763 art unit is (703) 872-9310. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (703) 308-0661. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (703) 308-1633.

A handwritten signature in black ink, appearing to read 'Jeffrie R. Lund', is positioned above the printed name and title.

JEFFRIE R. LUND
PRIMARY EXAMINER